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Report to Stakeholders Staff

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Published data and documents relating to the Environmental Restoration Program are available for public review in information repositories at four locations. The current information repositories are located in the cities of Boron, Lancaster and Rosamond, as well as Edwards AFB. They are updated when new documents are released.

If you have any questions about information in the repositories, please contact Gary Hatch, Environmental Public Affairs at (661) 277-1454 or through e-mail at gary.hatch@edwards.af.mil.

Location	Days and Hours of Operation	
Edwards AFB Library 5 W. Yeager Blvd. Building 6225 Edwards AFB, Calif. (661) 275-2665	Mon-Thurs Fri. Sat & Sun	9:30 a.m. - 7 p.m. 9:30 a.m. - 6 p.m. 10:30 a.m. - 6 p.m.
Kern County Public Library Wanda Kirk Branch 3611 Rosamond Blvd. Rosamond, Calif. (661) 256-3236	Tue & Wed Thu-Sat	Noon - 8 p.m. 10 a.m. - 6 p.m.
Los Angeles County Public Library 601 W. Lancaster Blvd. Lancaster, Calif. (661) 948-5029	Mon-Wed Thu & Fri Sat	10 a.m. - 8 p.m. 10 a.m. - 5 p.m. 11 a.m. - 5 p.m.
Col. Vernon P. Saxon, Jr. Aerospace Museum 26962 Twenty Mule Team Road Boron, Calif. (760) 762-6600	Mon-Sun	10 a.m. - 4 p.m.

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March 2005
95TH AIR BASE WING
Volume 10 No. 3

Report to
STAKEHOLDERS
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INSIDE

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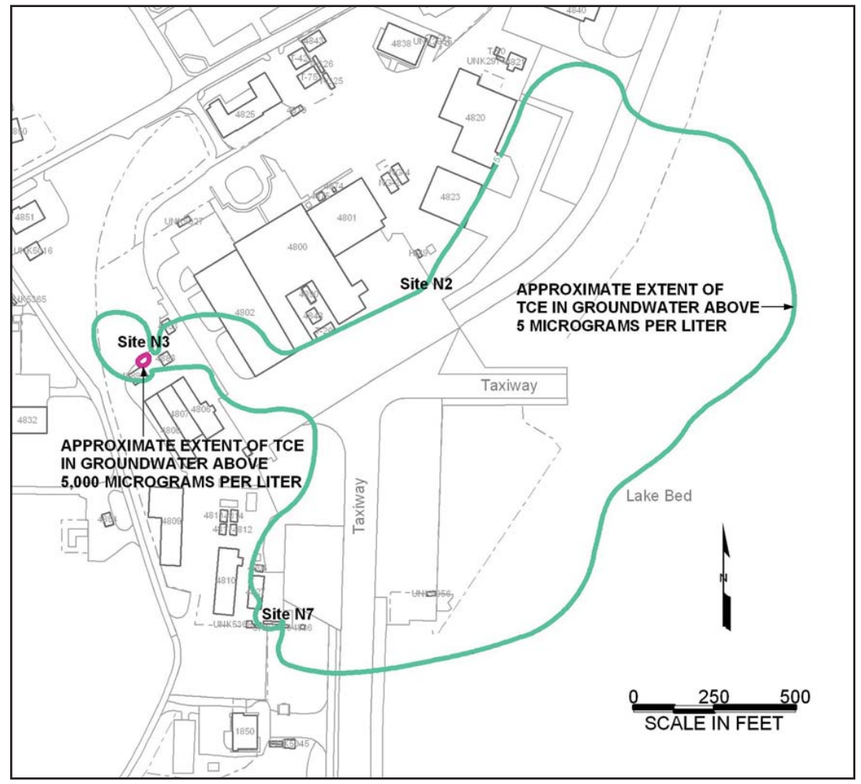


LOCATION, LOCATION, LOCATION — *Groundwater Sites N2, N3 and N7 are located on the lakebed side of the NASA Dryden Flight Research Center. Linking the three is an underground puddle of contamination, known as a plume. The plume's outside edges are shown with a green line.*

Air Force plans cleanup at NASA Dryden sites

An Air Force and National Aeronautics Space Administration (NASA) environmental managers want people to comment on the proposed cleanup plan for contamination located in the groundwater below the NASA Dryden Flight Research Center at Edwards Air Force Base (AFB). The base cleanup

See *OU 6* page 4

Stakeholders forum

If you have a question about the Edwards Air Force Base Environmental Management program, you may address it to Stakeholders Forum, Attn: Gary Hatch or Miriam Harmon, 5 E. Popson Ave., Edwards AFB, CA 93524-8060, or send e-mail to: afftc.em.com.rel@edwards.af.mil

Next RAB Meeting

May 2005
5:30 p.m.
Lancaster
Location
To be determined

The public is invited.

Q. What constitutes a good season of wildflower growth and a bad season of wildflower growth? What kind of wildflowers grow on Edwards AFB?

A. Spring wildflower growth at Edwards AFB can vary substantially from one year to the next. Blooms are dependent upon many environmental factors, with winter precipitation, and spring temperatures being the key ones. Natural Resources Management contractor Mark Bratton says, "this season looks very good for lots of blooms." To see for yourself, you can join Natural Resources Management for a tour.


Desert coreopsis

This year, Environmental Management (EM) will conduct wildflower tours, available to anyone on base on the following dates: April 7 at 9 a.m., Earth Day, April 22 at 10:30 a.m., noon and 1:30 p.m., May 5 at 11 a.m., and May 12 at 3 p.m. For more information, contact the EM office at (661) 277-1401.

However, there are no set guidelines as to what makes a good and a bad wildflower season. A good wildflower season usually means that there was plenty of rain to allow the plants to germinate. For example, some seeds have a coating on them and will not grow until enough water has washed away the coating. Timing of rain fall is another key factor for an abundant wildflower season. Winter rains allow the seeds to start germinating and rains later in the season allow the plants to continue growing.

"For this wildflower season at Edwards, the base received early rains in October and November, which allowed the plants to start to germinate," Bratton said. "There were also heavy rainfalls in December and early January of this year, so the second pouring of rain should give the plants enough water and energy to grow and produce flowers."

Getting huge amounts of rain at one time can also cause a bad wildflower season. Early heat can shorten the season causing the wildflowers to dry out quicker.

"On base, wildflowers can usually be seen around the months of March through late May," Bratton said. "But, it may be shorter or longer depending on the weather."

Some examples of the kinds of wildflowers that grow on base are the desert cymopterus, royal lupine, desert candle, sun cup, coreopsis, California hyacinth, and desert dandelion to name a few. ■

Report to Stakeholders is a publication of the Edwards AFB Environmental Management Division. Its purpose is to inform and educate the public, base workers and residents about continuing Environmental Management efforts at Edwards AFB. It currently has a circulation of 6,000, including about 2,000 subscribers.

Contents of the *Report to Stakeholders* are not necessarily the official view of, or endorsed by, the U.S. government, the Department of Defense, or the Department of the Air Force.

All photos are property of the Air Force.

Comments or questions should be directed to: Gary Hatch, 95 ABW/PAE, 5 E. Popson Ave., Bldg. 2560A, Edwards AFB, CA 93524-8060, (661) 277-1454. **E-mail: gary.hatch@edwards.af.mil**

Report to **STAKEHOLDERS**

Commander 95th Air Base Wing..... Col. Drew D. Jeter
Base Civil Engineer..... James Judkins
Division Chief Environmental Management..... Robert Wood
Branch Chief Environmental Restoration..... David Steckel
Branch Chief Environmental Conservation..... Gerald Callahan
Branch Chief Environmental Quality..... Robert Shirley

OU 6:
FROM page 5

nation to create harmless byproducts. Two different chemicals, Fenton's reagent and permanganate, have already worked in tests at NASA. Workers would drill 2,550 wells to inject the chemicals. This alternative would take about three years and cost about $71.5 million.

4. Source control and hydrologic control with groundwater monitoring and land use control – This alternative is a mix of the first three. The only areas where chemicals would be injected are where the contamination is most concentrated, called source areas. The rest of the contamination would someday be diluted to safe levels. Only 23 wells would be drilled. It will take more than 10 years to clean the groundwater. This alternative would cost about $1.9 million.
5. No action – This alternative is required, and is only listed to compare to the others. Nothing would be done at the Operable Unit. The contamination would remain in place. This alternative would cost nothing.

Comparing the alternatives to cleanup requirements

The Air Force looks at nine criteria when choosing a way to clean up a contaminated site. The five alternatives are compared against the nine criteria are in the table on page 6.

Alternative four is preferred

The Air Force, NASA, the U.S. EPA, and the state of California agencies all prefer alternative four. That alternative is preferred because it will clean up the contamination and protect people. It also is cheaper and will not have as much an impact on the NASA mission as alternative three. ■

Share your opinions

Your input helps the Air Force and NASA choose the best way to deal with the contamination. You may fill out and return the enclosed form, e-mail or fax your comments to the Air Force. The contact information is on the last page of this document your comments must be postmarked by the last day in the comment period:

Public comment period: March 18, 2005 – May 1, 2005

You may also share your views by attending a meeting. The Air Force is holding an availability session/public meeting on April 19, 2005 from 6 to 8 p.m. at the Wanda Kirk Library in Rosamond. NASA workers can discuss the plans at an availability session at the 2nd floor mezzanine of Building 4800 on April 20 from 11 a.m. to 1 p.m.

During these sessions you can meet the cleanup team, ask questions and view maps of the project. The Air Force and NASA will give a presentation to explain their plan for cleaning up the contamination. They will also answer your questions and give you a chance to speak for the public record. Written comments will be accepted at the meetings.

HAZARDOUS WASTE
FROM page 3

on-base transportation of hazardous wastes.

Hazardous waste is stored in Department of Transportation compliant containers compatible with the type of waste stored. The containers can't have structural deficiencies and cannot be overfilled. All containers are properly marked with Department of Transportation labels for content, hazard type and accumulation start time. The containers are stored in containment areas to prevent human or environmental contamination in the event of a leak.

The HWSF can accept and store a variety of hazardous wastes including fuel, oil, contaminated water, paint material, contaminated debris, solvents, corrosive material, oil, and lab reagents. However, the HWSF cannot accept certain listed chemicals, such as polychlorinated biphenyls (PCBs). Chemicals such as PCBs are acutely toxic and, therefore, must be handled in a different manner.

Responsibility for the HWSF falls under EM's Environmental Quality Branch. For more information about the HWSF or for accumulation points, call the EM office at (661) 277-1401.

ON THE INSIDE — *The hazardous waste support facility is permitted to store wastes for up to one year.*

Cleanup Criteria and Operable Unit 6 Cleanup Alternative

		Alternatives				
	CERCLA Criteria	**Land Use Controls (LUCs)**	**Groundwater Monitoring/Hydrologic Control with LUCs**	**Chemical Oxidation with LUCs**	**Source Control and Hydrologic Control with Groundwater Monitoring and LUCs**	**No Action**
1.	**Overall Protection of Human Health and the Environment**	YES	YES	YES	YES	YES
	Addresses whether a remedy provides adequate protection of human health and the environment and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.					
2.	**Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**	May not, if natural processes do not degrade the pollutant.	May not, if natural processes do not degrade the pollutant.	YES, within 3 years.	YES, within an extended timeframe.	May not, if natural processes do not degrade the pollutant.
	Addresses whether a remedy will meet all ARARs for federal and state environmental statutes or provide grounds for invoking a waiver.					
3.	**Long-term Effectiveness**	YES, but long-term reduction to safe levels is unlikely.	YES, but long-term reduction to safe levels is unlikely.	YES, with long-term verification mechanisms.	YES, with long-term verification mechanisms.	YES, but long-term reduction to safe levels is unlikely.
	Refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.					
4.	**Reduction of Toxicity, Mobility, and Volume (TMV)**	Using natural processes	Using natural processes	Using treatment processes	Using natural processes following treatment	Using natural processes
	Refers to the ability of a remedy to reduce the toxicity, mobility, and volume of the hazardous components present at the site.					
5.	**Cost**	$126,000	$1.34 Million	$71.5 Million	$1.9 Million	$0
	Evaluates the estimated capital and operation and maintenance costs of each alternative.					
6.	**Short-term Effectiveness**	No construction - no risk to workers	Precautions to protect public during soil drilling	Precautions to protect public during soil drilling, longer construction time	Precautions to protect public during soil drilling	No construction - no risk to workers
	Addresses the period of time needed to complete the remedy, and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until the cleanup goals are achieved.					
7.	**Implementability**	No construction permits	Uses conventional equipment/methods for groundwater work	May be difficult to disperse oxidizers in fractured bedrock; wells could impact mission;	May be difficult to disperse oxidizers in fractured bedrock	No construction permits
	Refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed to carry out a particular option.					
8.	**State Acceptance**				YES	
	Indicates whether, based on its review of the information, the state concurs with, opposes or has no comment on the preferred alternative.					
9.	**Community Acceptance**	Evaluated after the public comment period ends.	Evaluated after the public comment period ends.	Evaluated after the public comment period ends.	Evaluated after the public comment period ends.	Evaluated after the public comment period ends.
	Indicates whether community concerns are addressed by the remedy and whether the community has a preference for a remedy. Although public comment is an important part of the final decision, the Air Force is compelled by law to balance community concerns with all of the criteria.					

What does Edwards do with industrial waste?

As much as possible, Edwards AFB tries to keep hazardous waste to a minimum," said Sharon Soliz, an EM contractor at Edwards. "Environmental Management tracks hazardous waste from cradle to grave, that is, from generation to disposal."

Edwards AFB is known for its testing and evaluation of military aircraft. Tenants on base, like the Air Force Research Laboratory and NASA Dryden, specialize in research and development programs. Whether it is testing or development, these cutting-edge programs generate both hazardous and non-hazardous waste.

Some hazardous wastes that are produced at Edwards AFB include paint wastes, oil, jet fuel residual and used cleaning solutions. To prevent these from posing a threat to humans or the environment, the Air Force keeps track of all the hazardous waste that is produced, collects it for storage, and prepares it for off-base recycling and disposal.

Most of these activities take place at a hazardous waste support facility (HWSF) on base.

The HWSF, previously known as the conforming storage facility, has been in operation since 1995. Its name was changed recently to better reflect its function as a support facility that only stores large amounts of hazardous wastes for up to a year under a state permit.

There are accumulation points on base where low-yield hazardous wastes up to 55 gallons can be stored for 270 days. When the accumulation points reach their regulated limit, the hazardous wastes are transported to an accumulation site or to the HWSF. Unlike the HWSF, accumulation points and sites are only temporary storage areas for hazardous waste. Accumulation sites can hold any amount of hazardous waste for up to 90 days. If these collections areas are noncompliant with time or capacity limit, fines and penalties are imposed.

The HWSF schedules pick-up of containers by working closely with environmental support zone specialists and generators of hazardous waste. A database program – the Hazardous Materials Management System (HMMS) – supports their efforts by tracking information on storage dates and alerting generators and support zone specialists when critical deadlines are reached (see *February 2005 Report to Stakeholders*).

Reports concerning the hazardous wastes that have been picked up twice a week help the HWSF staff prioritize which containers need to be picked up from collection sites.

To keep track of the transfer, generators fill out a waste turn-in document that is signed by the HWSF upon pickup. The generators of the hazardous wastes and the HWSF keep a copy of the waste turn-in document for at least three years. This

STORING WASTE — *Hazardous waste support worker Cat McDonald takes an inventory of stored waste.*

information is also entered into HMMS for future reference. Once a year, the HWSF submits a waste analysis plan to the Department of Toxic Substances Control (DTSC) that lists the amounts of hazardous waste produced on the base.

Staff at the HWSF collect and receive waste from around the base. The waste is stored for disposal by the Defense Reutilization and Marketing Office (DRMO). The DRMO contracts 21st Century Environmental Management to pick up the stored waste from the HWSF. The pickup of hazardous waste must be coordinated through the HWSF, the DRMO cannot pick up the waste at an industrial complex directly.

The HWSF prepares the waste to turn into the DRMO, doing all the technical work, sampling, classification, record keeping and so forth.

"The HWSF processes 200 containers of liquid or solid hazardous waste and 220,000 pounds of bulk liquid or solid hazardous waste each month," said Dennis Young, EM contractor and HWSF facility manager. "The HWSF coordinates pickup with DRMO every 90 days or sooner, depending on how much waste the facility has received."

The HWSF follows protective measures to ensure human health and the environment are not affected by the storage or

See *Hazardous Waste* page 7

OU 6: Public gets opportunity to comment on three sites

FROM page 1

Pollution in groundwater at NASA Dryden

Pollution	Highest 2004 level (µg/L)	MCL (µg/L)	Cancer causing?
1,2-Dibromoethane	0.82	0.05	Probable
1,2-DCA	33	0.5	Probable
cis-1,2-DCE	1,300	6	Inconclusive
trans-1,2-DCE	16	10	Inconclusive
Benzene	11,000	1	Probable
Carbon Tetrachloride	2,600	0.5	Possible
Chloroform	550	100	Probable
Ethylbenzene	1,100	700	No
Methylene Chloride	100	5	Inconclusive
Toluene	21,000	150	No
Total Xylenes	6,400	1,750	No
TCE	13,000	5	Probable

This table shows the chemicals in the groundwater that are higher than the safe limits in the Safe Drinking Water Act. Although people do not drink this water, the numbers from the Safe Water Drinking Act guide the restoration program in cleaning up contamination. The Safe Water Drinking Act calls these limits the maximum contaminant level, or MCL in the table. The symbol µg/L means micrograms per liter. It is a common unit of measure used to track contamination in groundwater. One microgram per liter is equal to 1 part contamination and 999,999 parts water.

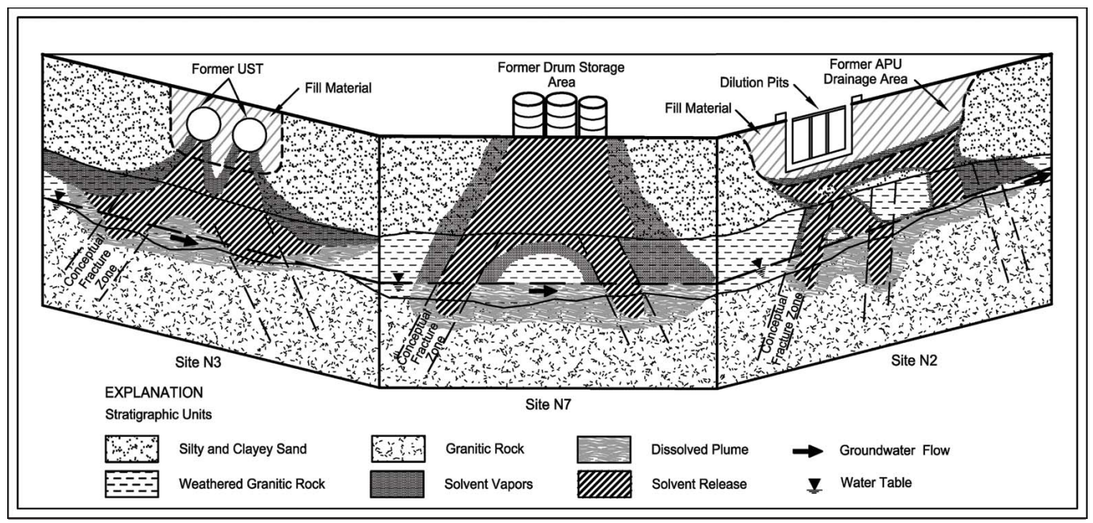
program calls the area on NASA Dryden Operable Unit 6, or OU6.

Other agencies like the U.S. Environmental Protection Agency (U.S. EPA), the California state Department of Toxic Substances Control (DTSC) and the Lahontan Regional Water Quality Control Board are working closely with Air Force and NASA Dryden managers to clean up the contamination in this Operable Unit.

Where it is and how it got there

The underground contamination at NASA Dryden is made up of fuels and solvents related to aircraft work conducted at the site in the past. Air Force and NASA workers started looking for contamination in 1987, looking first at 19 places where hazardous materials were used or stored.

Workers used drills to take soil and water samples from underground. The samples were then taken to off-base laboratories to see what chemicals were present.



Side view of the three sides

The samples pointed the cleanup team to three spots where the amounts of contamination were highest. The results of the sample tests came back and chemicals that the government considers dangerous to people are listed in the table at the top of page 4. The two spots with soil contamination are called Site N1 and Site N4. Area of concern N14 showed no soil contamination. There are also three spots where the groundwater is contaminated. These are called Site N2, Site N3 and Site N7. The regulatory agencies agreed that the other 13 areas were not dangerous.

Site N1 is a retention pond. This is an area where rainwater runoff collects from the north part of the NASA Dryden area. Chemicals spilled on asphalt or concrete may have moved to Site N1 with the rain water. The area is still used today, so this site will be managed by the base compliance program.

Site N4 is also a retention pond. It collects rainwater from the south part of the NASA Dryden area. It also had a wash rack. This wash rack was originally used to work with alcohol fuels and hydrogen peroxide in the 1950's. Later, it was used to steam clean aircraft and equipment. Contamination could have drained through cracks in the concrete into the soil. The U.S. EPA, the state of California and the Air Force think the most contaminated soil at Site N4 was caused by rainwater that washed over fresh asphalt right before the sampling.

Area of concern N14 is the area where space shuttle fuels were stored on top of concrete. Samples ate the site don't show any contamination in the soil underneath the concrete.

The Air Force recommendation is a No Action Remedy for soils at Sites N1, N4, and area of concern N14. The U.S. EPA and the state of California agree because of the tiny amounts of contamination in the soil there is very little risk to workers and planned industrial use at the sites.

However, the three sites where the levels of contamination will require cleanup. The groundwater under NASA Dryden is not used for drinking. The nearest drinking water wells are at North Base, which is several miles north and much deeper.

Site N2 is a drainage area where waste from an auxiliary power unit was dumped many years ago. It also collected rain water that ran off the concrete from an aircraft run-up area. Concrete pits at the site were also used to mix water with hydrogen peroxide to make it less dangerous for workers.

Site N3 was a gas station where three underground storage tanks used to be and may have leaked. There is also a ditch that may have collected chemicals leaking from drums sitting on the dirt.

Site N7 was used to store hazardous materials and hazardous wastes in steel drums, which leaked.

The samples taken show there is a plume of contamination beneath and in between the three sites. The plume stretches about 1,800 feet east of Site N3, and starts at 10 feet under the ground surface. A side view diagram is seen on the bottom of the previous page. This plume is mostly the solvent trichloroethylene, which is hard to clean up because it sinks in water.

No risk to NASA Dryden workers

Although the contamination is there, it is not a risk to NASA workers. For contaminants to hurt people, three things must happen. First, there must be enough of the contamination to do harm; second, there must be people at the site; and, third, the people at the site need to come into contact with the contamination. Contamination occurs from touching, eating, drinking or breathing it in.

The contamination at NASA Dryden is at least 10 feet underground. So, a person doing normal aircraft work on asphalt or concrete surface would not be able to touch, eat, drink or breathe it in. People digging may have to take special precautions to protect themselves from the contamination.

Cleanup options

Base workers are looking at five different ways to manage and clean up the contaminated groundwater. The cleanup team compared each alternative against the nine criteria required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. The feasibility study completed in August 2004 provides more detail. The five possible alternatives are:

1. Land use controls – The Air Force and NASA Dryden do not allow access to the sites except for workers. All projects on base require approval for construction or digging in the soil. Information on the contamination is included in the Edwards AFB Geographic Information System. This system allows users to find out everything they need to know about a piece of land before a project is started. If workers do need to dig in the area, they can wear protective equipment. The natural movement of the groundwater will someday dilute the contamination to a level that is safe. This will take longer than 10 years. This alternative is estimated to cost $126,000 over 30 years.
2. Groundwater monitoring, hydrologic control with land use controls – This alternative is the first alternative with some extra steps. The extra steps would include taking groundwater samples every year and putting in equipment to keep the groundwater and contamination from moving. Other details of this alternative will be worked out in the next stage of the cleanup, called Remedial Design. The Air Force does not know how long it will take to clean up using this alternative. It is estimated to cost $1.34 million.
3. Chemical oxidation with land use controls – With this alternative, cleanup workers would inject chemicals into the ground that would react with the contami-

See *OU 6* page 6

How to get more information

If you want more information on the underground contamination at NASA Dryden, you can look at technical books we have available for the public at four locations. Those locations are located on page 8 of this newsletter.